WHAT IS CLAIMED IS:

1. An ultrashort pulsed laser device, comprising:

a pump laser diode having linear polarization;

a solid laser medium oscillating with linear polarization;

an optical fiber maintaining a polarization direction; and

a saturable absorber mirror,

wherein the solid laser medium is disposed between the optical fiber and the saturable absorber mirror,

laser light emitted from the pump laser diode optically is coupled with a first end face of the optical fiber, and laser light emitted from a second end face of the optical fiber pumps the solid laser medium, and

the first end face of the optical fiber and the saturable absorber mirror constitute a laser resonator.

2. The ultrashort pulsed laser device according to claim 1, wherein a dielectric multilayer film is formed on the first end face of the optical fiber, the dielectric multilayer film having a low reflectance with respect to light from the pump laser diode and having a high reflectance with respect to light oscillating in the laser resonator.

3. The ultrashort pulsed laser device according to claim 1, wherein the optical fiber is a photonic fiber.

4. The ultrashort pulsed laser device according to claim 1, wherein the solid laser medium is composed of Nd : YVO_4, Nd : $GdVO_4$ or Cr : LiSAF.

5. An ultrashort pulsed laser device, comprising:

a pump laser diode having linear polarization;

a waveguide solid laser medium formed on a ferroelectric crystal substrate, which oscillates with linear polarization and has a waveguide loss controlling unit; and

an optical fiber maintaining a polarization direction,

wherein a first end face of the optical fiber and a first end face of the waveguide solid laser medium are opposed so as to optically couple with each other,

laser light emitted from the pump laser diode is coupled with a

second end face of the optical fiber or a second end face of the waveguide solid laser medium so as to pump the waveguide solid laser medium, and

the second end face of the optical fiber and the second end face of the waveguide solid laser medium constitute a laser resonator.

6. The ultrashort pulsed laser device according to claim 5, wherein the waveguide loss controlling unit is constituted with a directional coupler formed on the ferroelectric crystal substrate.

7. The ultrashort pulsed laser device according to claim 5, wherein the waveguide solid laser medium comprises a wavelength conversion unit.

8. An optical head, comprising the ultrashort pulsed laser device according to claim 1,

wherein the ultrashort pulsed laser device is provided with a power output unit, and the optical fiber is disposed between the power output unit and the pump laser diode, and

the pump laser diode is fixed to a heat sink mount and the power output unit is fixed to an optical head mount that is provided separately from the heat sink mount.

9. The optical head according to claim 8, wherein the power output unit is the saturable absorber mirror.

10. An optical head, comprising an ultrashort pulsed laser that comprises a pump laser diode having linear polarization; an optical fiber to which a transition element is doped; and a saturable absorber mirror,

wherein the ultrashort pulsed laser is provided with a power output unit, and the optical fiber is disposed between the power output unit and the pump laser diode, and

the pump laser diode is fixed to a heat sink mount and the power output unit is fixed to an optical head mount that is provided separately from the heat sink mount.

11. The optical head according to claim 10, wherein the power output unit is the saturable absorber mirror.

12. An optical information processor for recording and reproducing information with respect to a recording medium, comprising:

the optical head according to claim 8;

an optical system for introducing light emitted from the short pulsed laser in the optical head to the recording medium; and

an optical system for detecting light reflected from the recording medium.

13. An optical information processor for recording and reproducing information with respect to a recording medium, comprising:

the optical head according to claim 10;

an optical system for introducing light emitted from the short pulsed laser in the optical head to the recording medium; and

an optical system for detecting light reflected from the recording medium.